CLAIMS

What is claimed is:

1. A method for providing animation to a target head model, the method comprising the steps of:

5   receiving target head image data including a plurality of target head vertices data including a location data for each of the plurality of head vertices data;

       providing standard head image data including a
10 plurality of standard head vertices data including a location data for each of the plurality of standard head vertices data;

       associating a plurality of standard head marker locations on the standard head model to a corresponding
15 one of a plurality of target head marker locations on the target head model, wherein each standard head marker is one of a subset of the plurality of standard head vertices data, and each target head marker is one of a subset of the plurality of target head vertices data;

20   determining a transformation for morphing the standard head to the target head, wherein the morphing function is determined using a least squares optimization function of a preselected norm of the difference between a predetermined function of the subset of the plurality
25 of standard head vertices data and the corresponding subset of the plurality of target head vertices data;

       providing an expression vector including expression image data corresponding one or more images corresponding

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to an expression to be displayed on the standard head; and

determining a target expression vector including target expression image data as a function of the morphing function and the expression data, wherein the target expression image data is displayable on the target face.

2. The method of claim 1 further including the step of displaying the target first image data.

3. The method of step 1 wherein the preselected norm is a Euclidean norm.

4. The method of step 1 wherein the preselected norm is the sum of the squares of the predetermined function and the subset of the plurality of target head vertices.

5. The method of step 1 wherein the preselected function is a polynomial.

6. The method of step 1 wherein the preselected function is a NURBS.

7. The method of step 1 wherein the preselected function is a rational polynomial.

8. The method of step 8 wherein the rational polynomial is a Chebychev polynomial.

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9.   The method of step 1 wherein preselected function is
an expansion or trigonometric functions.

5   10.   The method of step 1 wherein preselected function is
an expansion of exponential functions.

11.   The   method   of   claim   1   wherein   the   step   of
determining a target expression matrix includes:

10   transforming   the   plurality   of   standard   expression
vertices   data   into   a   plurality   of   target   expression
vertices data by applying the predetermined function to
the plurality of standard expression vertices data.

15   12.   The   method   of   claim   1   wherein   the   standard   head
image data includes a standard head basis matrix and a
standard   head   mean   value   and   wherein   the   expression
matrix includes a standard expression basis matrix and a
plurality of animation vectors that when multiplied by
20   the   standard   expression   basis   matrix   provides   the
standard expression image data, the step of determining a
target expression matrix includes:

transforming   the   standard   head   basis   into   a   target
head basis matrix by applying the predetermined function
25   to the standard basis matrix;

subtracting   the   standard   head   mean   value   from   the
target head basis matrix forming a modified target head
basis matrix;

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multiplying the modified target head basis by at least one animation vector to provide target expression image data.

13. A method for providing target expression image data for use with a target head image data model, wherein the expression image data corresponds to one or more images corresponding to an expression to be displayed on a standard head, wherein said expression image data includes a plurality of expression vertices data including a location data for each of the plurality of expression vertices data, wherein the standard head image data includes a plurality of standard head vertices data including a location data for each of the plurality of standard head vertices data, wherein the standard head image data is anthropomorphically mapped into the target head image data model, the method comprising the steps of:

providing the target head image data including a plurality of target head vertices data including a location data for each of the plurality of head vertices data;

associating each of a subset of the plurality of target head vertices data with a corresponding one of the plurality of standard head vertices data;

determining a transformation to transform the surface and features of the standard head to the surface and features of the target head, wherein the transformation is determined using a least squares

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optimization function of a preselected norm of the difference between a predetermined function of the subset of the plurality of standard head vertices data and the corresponding subset of the plurality of target head vertices data;

providing a plurality of target expression image data as a function of the warping function and the standard expression image data, wherein the target expression image data is displayable on the target face;

providing a mask to insert a predetermined portion of the target emotion image data into the first head image data; and

creating a target head expression image data by inserting the predetermined portion of the target expression image data into the target head image data using the mask.

14. The method of step 13 wherein the target image data and the target expression matrix are provided on computer readable medium.

15. The method of step 14, wherein the computer readable medium is a magnetic disk.

16. The method of step 14, wherein the computer readable medium is an optical disk.

17. The method of step 14, wherein the computer readable medium is a CD ROM.

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18. The method of step 14, wherein the computer readable medium is a DVD disk.

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